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OBITUARY

REGINALD CHARLES TREHERNE

It is with profound regret that we record the loss of our esteemed colleague, Reginald Charles Treherne, whose death occurred late Saturday evening, June 7th, 1924. Mr. Treherne had been absent from Ottawa for a week or ten days visiting laboratories in Western Ontario. On his return to Ottawa, he developed what was thought to be a slight cold. During the week beginning June 2nd, however, his condition became serious and in the end acute peritonitis developed. This necessitated an operation from which, unfortunately, he never recovered.

Mr. Treherne was born at Aldershot, England, on March 24th, 1886. His early education was received at St. Christopher's School, Eastbourne, and Wellington College, in Berkshire. He came to Canada in the spring of 1905, at which season he attended the Ontario Agricultural College before the close of the college year. The summer months were spent on a farm near Guelph. In the autumn of 1905, he entered for the regular course, graduating in 1909 with the Degree of Bachelor of Science of Agriculture. During the summer of 1908, he was employed in entomological investigations by the Louisiana State College and during the summer of 1909 was engaged in nursery inspection work in the province of Ontario. In the same year he was appointed a Field Officer in the Dominion Entomological Service and from that year until 1911 he was engaged in investigations in the provinces of New Brunswick and Ontario. In 1911 he was transferred to British Columbia where he remained until 1922. In 1915, his title was changed from Field Officer to Entomologist in charge for British Columbia. In 1919, the provincial and federal entomological activities were coordinated, Mr. Treherne assuming the general direction of the work. During this period, too, he acted as Provincial Entomologist, and in 1921 and 1922 he lectured in Entomology in the University of British Columbia. The investigations which he undertook in British Columbia related to the bionomics and control of such important pests as the Cabbage Root Maggot, the Onion Maggot, the Strawberry Root Weevil, the Pear Thrips, the Codling Moth, the Peach Twig Borer, the various fruit worms prevalent in the Okanagan valley, the species of grasshoppers destructive to ranch lands, etc. In all of this work he was notably successful. The development of the federal and provincial entomological work in British Columbia was undoubtedly furthered very considerably by the organization effected by Mr. Treherne. In 1922, Mr. Treherne was transferred to Ottawa, being promoted to the position of Chief of the Division of Field Crop and Garden Insects. Since his transfer his experience and knowledge of economic problems have been of great value to his colleagues at Ottawa. He was keenly interested in the work of the Division and of the Branch and had recently inaugurated the "Insect Pest Survey" and the "Insect Pest Record," both of which have already been of great service to our officers.

In addition to the other work, Mr. Treherne found time, particularly during recent years, to devote considerable attention to the Thysanoptera, on which he was rapidly becoming a leading authority.

Mr. Treherne was a member of a number of important societies. During his residence in British Columbia, he was an active worker of the Entomological Society of British Columbia and its success during his residence in the province was largely due to his efforts. He was also a member of the American Association of Economic Entomologists, Entomological Society of America, Ecological Society of America, Association of Economic Biology (England), Fellow of the Entomological Society of London (England), Entomological Society of Ontario (Vice-President).

Outside of his entomological work, Mr. Treherne had been closely identified, since coming to Ottawa, with the Boy Scout Movement. He was Scoutmaster of the Ottawa Rover Scout Troop, now known as "Treherne's Own," and to its interests he devoted a very great deal of time and care.

In the death of Mr. Treherne, Canada has lost an able entomologist. On account of his entomological attainments he was held in high esteem not only by his co-workers in Canada, but also by scientists in European and other countries, particularly in the United States.

Mr. Treherne's wide interests, his virility, his nobility of character, and his most lovable disposition, had brought him the esteem and love not only of those directly associated with him but of an unusually large number of friends, to whom his death will be a personal loss and whose heartfelt sympathy will be extended to his widow and young son in this their hour of trial and sorrow.

The list of his papers, prepared by Mr. H. G. Crawford, follows :

PUBLICATIONS

1908. A New Predaceous Enemy of the Cotton Boll Weevil. Wilmot Newell and R. C. Treherne. Journ. Econ. Ent., Vol. 1, No. 4.
1908. Observations on the Sorghum Midge. Rep. Ent. Soc. Ont., No. 39.
1909. Report upon "Insects" for the year. Messrs. R. C. Treherne, R. W. Bartman, Harry Arnold and N. Foster. Rep. Fruit Branch, Ont.
1909. Nursery Work in Ontario. Rep. Ent. Soc. Ont., No. 40.
1910. Animal Instinct. Ottawa Naturalist, Vol. XXIV, No. 7.
1910. Report upon the insects of the year, Division No. 7, Niagara District, Rep. Ent. Soc. Ont., No. 41.
1911. Report upon the insects of the year, Division No. 7, Niagara District. Rep. Ent. Soc. Ont., No. 42.
1912. Annual Report B. C. Branch, Ent. Soc. Ont., Rep. Ent. Soc. No. 43.
1912. Notes on Injurious Insects in British Columbia in 1912. Rep. Ent. Soc. Ont., No. 43.
1913. Entomology in British Columbia. B. C. Academy of Science. 1913.
1913. Methods of Taking Insect Records in the Field. Proc. Ent. Soc. B. C., No. 3, N. S.
1913. Preventing Loss on the Farm, with references to Insects and Diseases. Fruit and Farm, Vol. IV, No. 11.
1914. Report from Vancouver District. Insects Economically Important in the Lower Fraser Valley. Proc. Ent. Soc. B. C., No. 4, N. S.
1914. Report of the Fiftieth Annual (Jubilee) Meeting of the Entomological Society of Ontario. Proc. Ent. Soc. B. C., No. 4, N. S.
1914. A Review of Applied Entomology in British Columbia. Proc. Ent. Soc. B. C., No. 4, N. S.
1914. The Strawberry Root Weevil (*Otiorynchus ovatus* Linn.) in British Columbia. With Notes on other insects attacking strawberry plants in the Lower Fraser Valley. Bul. 8, Can. Dept. Agr.
1915. The Tarnished Plant Bug (*Lygus pratensis* Linn.). Proc. Ent. Soc. B. C., No. 7, N. S.
1915. Ornamental and Shade Tree Insects. Proc. Ent. Soc. B. C., No. 7, N. S.
1915. Notes of Economic Interest from British Columbia. Can. Ent., Vol. XLVII, No. 4.
1916. The Cabbage Root Maggot and its Control in Canada, with notes on the Imported

- Onion Maggot and the Seed Corn Maggot. Arthur Gibson and R. C. Treherne. Bul. 12, Can. Dept. Agr.
1916. The Cabbage Maggot—Autumn Development in British Columbia. Rep. Ent. Soc. Ont., No. 47.
1916. The Cabbage Maggot in British Columbia (*Phorbia brassicae*). The Natural Control by Parasites and Predaceous Insects. Rep. Ent. Soc. Ont., No. 47.
1916. A Preliminary List of Parasitic Insects known to occur in Canada. Rep. Ent. Soc. Ont., No. 47, 1916.
1916. Some Orchard Insects of Economic Importance in British Columbia, Proc. Ent. Soc., B. C., No. 9, Econ. S.
1916. The Occurrence of *Glutops singularis* Burgess in British Columbia. Proc. Ent. Soc. B. C., No. 8, Syst. Ser.
1916. The Pear Thrips in British Columbia and its Control. A. E. Cameron and R. C. Treherne, Agr. Gaz. Can., Vol. 3, No. 11, pp. 946-952.
1917. The Cost of Spraying in the Control of the Pear Thrips in British Columbia. A. E. Cameron, R. C. Treherne and E. W. White. Agr. Gaz. Can., Vol. 4, No. 1, pp. 13-16.
1917. The Strawberry Root Weevil in British Columbia. Can. Ent., Vol. XLIX, No. 8.
1917. The Natural Immunity or Resistance of Plants to Insect Attack. Agr. Gaz. Can., Vol. 4, No. 10.
1917. The Apple Maggot in British Columbia. Can. Ent., Vol. XLIX, No. 10.
1917. The Pear Thrips (*Taeniothrips pyri* Dan.) in British Columbia. A. E. Cameron, R. C. Treherne and E. W. White. Agr. Gaz. Can., Vol. 3, No. 11, pp. 946-952; and 1917, Vol. 4, No. 1, pp. 13-16.
1918. The Control of Insects in Ships by Steam. Agr. Gaz. Can., Vol. 5, No. 7, pp. 668-669.
1918. Notes on the Aeolothripidae (1) Proc. Ent. Soc. B. C., No. 12, Syst. Ser.
1918. The Pear Thrips (*Taeniothrips inconsequens* Uzel), and its Control in British Columbia, A. E. Cameron and R. C. Treherne, Bul. 15, Can. Dept. Agr.
1919. Insect Notes for the Year 1918. (British Columbia) Leaf, B. C. Dept. Agr.
1919. Wireworm Control, with special reference to a method practiced by Japanese growers. Agr. Gaz. Can., Vol. 6, pp. 528-530.
1919. The History of the Codling Moth in British Columbia. Agr. Gaz. Can., Vol. 6, No. 1.
1919. Notes on the Thysanoptera from British Columbia. Can. Ent., Vol. LI, Nos. 8 and 9.
1920. The Onion Maggot. R. C. Treherne and M. H. Ruhman. Proc. Ent. Soc. B. C., No. 11, Econ. Ser.
1920. Notes on the Aeolothripidae (2). Proc. Ent. Soc. B. C., No. 16, Syst. Ser.
1920. A Note on the Wingless Tipulid, *Chionea valga* Harr. Can. Ent., Vol. 52, No. 9.
- 1918-1921. A Series of Circulars. Horticultural Branch, Dept. Agr. of the Prov. of B. C.
1919. The Peach-twig Borer. No. 31 (2nd Ed.).
1918. The Cabbage Root Maggot. No. 32.
1921. The Woolly Aphid of the Apple. No. 34 (2nd Ed.).
1921. The Currant Gall-mite. No. 35 (2nd Ed.).
1919. The Onion-thrips. No. 36 (2nd Ed.).
1918. The Imported Cabbage-worm. No. 37.
1921. Soap Solutions for Spraying. No. 40 (2nd Ed.).
1921. The Oyster-shell Scale. No. 41 (2nd Ed.).
1921. Some Notes on the Fruit Worms of British Columbia. Sci. Agr., Vol. 1, No. 3, 1921.
1921. The Colorado Potato Beetle. The Agr. Journ. B. C., Vol. 6, No. 7.
1921. The Fruit Worms of British Columbia. Rep. B. C. Fruit-growers Assoc., No. 3.
1921. A Further Review of Applied Entomology in British Columbia. Proc. Ent. Soc. B. C., Nos. 13 and 15, Econ. Ser.
1921. The Grasshopper and the Range. Agr. Journ. B. C., Vol. 6, No. 8.
1922. The Control of Insects Liable to be Imported in Railway Cars. Can. Ent., Vol. LIV, No. 6.
1922. Biochemical Aspects of Insect Control. Sci. Agr., Vol. 3, No. 3.
1922. Karny's Key to the Phloeothripidae. Proc. Ent. Soc. B. C., No. 20, Syst. Ser.
1922. Notes on *Frankliniella tritici* Fitch. Rep. Ent. Soc. Ont., Vol. LIII.
1922. The Imported Onion Maggot in British Columbia. Rep. Ent. Soc. Ont., Vol. LIII.
1923. Root Maggots and their Control. Pamphlet No. 32, (Rev. C. P. L. No. 4, 1918)
1923. Wireworm Control. Pamphlet No. 33, N. S., Can. Dept. Agr.
1923. The European Earwig in British Columbia. Proc. Ent. Soc. B. C., Nos. 17 and 19.
1923. The Peach Twig Borer. Proc. Ent. Soc. B. C., Nos. 17 and 19.
1924. The Control of Insect Pests:—Of Fruit and Vegetables. Can. Hort. Rev., Vol. 1, No. 1.
1924. Thysanoptera known to Occur in Canada. Can. Ent. Vol. LVI, No. 4.

In Press

The Male Genital Armature of Thysanoptera. With J. J. deGryse. Can. Ent.

The Grasshoppers of British Columbia, with particular reference to the influence of injurious species on the range lands of the province. With E. R. Buckell, Bul. No. N. S., Can. Dept. Agr.

A. Gibson, J. M. Swaine.

ADDITIONAL NEW SPECIES OF ERYTHRONEURA (HOMOPTERA, CICADELLIDAE).

BY W. ROBINSON

Department of Entomology, University of Kansas.

This has been called a "most intricate and perplexing genus" chiefly on account of the variations in color pattern which exist within the species, and of the running of the color pattern of one species into that of another. The writer's study of the genitalia of all of the known American species, including a large number of supposed variations, has revealed the fact that in several cases what were formerly supposed to be variations are, in reality, the definite color patterns of distinct species having remarkably characteristic genitalia.

Prof. R. H. Beamer and the writer have made a search for the hibernating adults this present winter in Kansas and have been fortunate in securing several new and beautiful species.

***Erythroneura irrorata* new species.**

Vertex red with a median and two lateral streaks of yellow. Pronotum, anterior part red with three yellow spots, remainder slaty-grey. Scutellum orange with darker spots in basal angles and tip. Tegmina hyaline, irrorate with red in region of veins, especially heavy along costal margin. An oblique black streak in apex of costal plaque. Apical cells more or less clouded with fulvous.

Holotype; male, Douglas Co., Kansas, February 11, 1924. R. H. Beamer and W. Robinson.

Type deposited in the Museum of the University of Kansas.

***Erythroneura cherokee* new species.**

Vertex yellow with a median "U" shaped vitta and two lateral streaks reddish. Pronotum yellow on anterior margin and slaty behind; on disk and close to posterior margin a brownish-red area with two horn-like prolongations projecting forward to meet the median vitta on vertex; a wide reddish lateral vitta behind each eye. Scutellum, a yellow spot outlined in brown in each basal angle, a yellow spot at tip, a white inverted "T" shaped vitta on disk. Tegmina hyaline with the following red markings: basal two-thirds of clavus occupied by a hatchet-shaped vitta which contains a black spot in its broad end; a spot at tip. On corium, an oblique streak at base, a streak bordering front of white costal plaque and broadening at middle of the inner margin until it touches the claval suture, proceeding backward in a narrowing line to the blue streak at apex of costal plaque, then continuing backward to the base of cell M^4 . Cross veins and adjacent parts of longitudinal veins crimson; apical veins white; apical cells hyaline bordering cross-veins and followed by a dark smoky area, remainder of cells light smoky; a black spot in the apex of cell R^3 and base of cell M^4 .

Holotype; male, Cherokee Co., Kansas, December 30, 1923. R. H. Beamer.

Type deposited in the Museum of the University of Kansas.

***Erythroneura portea* new species.**

General ground color yellowish white with the following markings: vertex, an inverted "V" shaped reddish vitta. Pronotum, a slaty-brown area on disk with two reddish arms projecting forward to meet the vitta on vertex; a lateral vitta behind each eye. Scutellum, a yellowish spot outlined in red in each basal

angle and yellow spot at tip. Tegmina, a reddish vitta arising in base of clavus, soon broadening and proceeding across corium to costal plaque where it becomes as wide as length of plaque, then proceeding inward and dividing into two arms one of which touches tip of clavus and other the base of cell M^4 . This vitta is sometimes paler within and margined in dark red; sometimes bluish within with dark red margin; tip of clavus is pale red. Costal plaque yellowish white with an oblique black or blue streak at apex. Cross veins and adjacent parts of longitudinal veins crimson. Apical cells smoky except part adjoining cross veins.

Holotype; male, Jordan, Ontario August 1922, W. Robinson.

Allotype; female, Jordan, Ontario, August 1922, W. Robinson.

Paratypes; males and females, Jordan, Ontario, August 1922, W. Robinson; Cherokee Co., Kansas, December 30, 1923, R. H. Beamer.

Types deposited in the Museum of the University of Kansas.

***Erythroneura pulchella* new species.**

Vertex light brown with anterior margin, a median vitta enlarged at each end, and a lateral spot opposite each eye, yellowish; all these marks outlined in dark brown. Pronotum light brown with a blackish ring on disk and two grey spots on posterior margin; five grey spots outlined in dark brown arranged around lateral and anterior margins. Scutellum light brown with a black triangular spot in each basal angle and a median white vitta outlined in brownish red. Tegmina, clavus chocolate-maroon except two spots near base and one in apical third greyish; corium grey with dashes of brown between the longitudinal veins the latter of which are whitish dotted with red; costal plaque whitish on inner and red on outer margins and having a black streak at each end; cross veins and apical veins pinkish white; apical cells smoky-brown.

Holotype; female, Cherokee Co., Kansas, December 30, 1923, R. H. Beamer.

Type deposited in the Museum of the University of Kansas.

***Erythroneura torra* new species.**

Vertex and pronotum yellow with a red median inverted "V" shaped vitta. Scutellum, a brown spot in each basal angle; a white median vitta outlined in red. Tegmina hyaline, a broad red vitta on clavus and a pale orange vitta on corium, both paralleling claval suture; costal margin yellowish.

Holotype; male, bearing a label marked "Kansas 2326."

Type deposited in the Museum of the University of Kansas.

***Erythroneura brundusa* new species.**

Vertex red with anterior margin yellow. Pronotum, lateral and anterior margins yellow; disk smoky bounded on each side by an oblique maroon vitta. Scutellum brownish-red with a short white median vitta. Tegmina dark maroon with bronze iridescence grading down to semi-hyaline in region of cross veins. Costal plaque opaque-white. Apical cells dark-smoky.

Holotype; female, bearing a label marked "Douglas Co., Kansas, April."

Type deposited in the Museum of the University of Kansas.

***Erythroneura fulvocephala* new species.**

Vertex smoky-yellow to fulvous, eyes black. Pronotum smoky-grey with two orange vittae on disk. Scutellum smoky-yellow. Tegmina whitish-hyaline

with a red vitta on each side, and running full length, of claval suture.

Holotype; male, Douglas Co., Kansas, P. B. Lawson.

Allotype; female, Douglas Co., Kansas, P. B. Lawson.

Paratypes; males and females, Douglas Co., Kansas, P. B. Lawson.

Types deposited in the Museum of the University of Kansas.

***Erythroneura mediana* new species.**

Vertex, five yellow spots more or less outlined in red and arranged two on anterior and two on posterior margins, and one central. Pronotum whitish with a median "Y" shaped vitta and two lateral spots reddish. Scutellum yellow with an orange spot outlined in red in each basal angle, and tip red. Tegmina opaque-white with the following red marks: clavus, a spot near base, another near tip and a larger area about the middle, the latter of which having the anterior margin concave and posterior convex. Corium, a spot near base, an oblique streak running from front of costal plaque to near the spot in tip of clavus. Longitudinal veins throughout greater part of their length and also cross veins streaked or dotted with red. A black spot in base of cell M^4 .

Holotype; male, Douglas Co., Kansas, January 1924, R. H. Beamer.

Allotype; female, Douglas Co., Kansas, January 1924, R. H. Beamer.

Types deposited in the Museum of the University of Kansas.

***Erythroneura torella* new species.**

Ground color of vertex, pronotum and scutellum yellowish with the following marks in crimson: vertex, an oval outline on disk with an extension on each side to meet the eye. Pronotum, a median "Y" shaped vitta whose arms enclose a yellow circular spot, a lateral streak behind each eye. Scutellum, a triangle in each basal angle and a spot at tip. Tegmina whitish with the following marks in orange-red: a broad vitta with caudal barb occupying basal half of clavus, and a spot at tip; a spot in base of corium; a mark arising at base of costal plaque, continuing around the inner margin to the apex where it extends inward to the base of cell M^4 then curves outward again to the crimson radius. A small dot in base of cell M^4 .

Holotype; male, Cherokee Co., Kansas, December 30, 1923, R. H. Beamer.

Type deposited in the Museum of the University of Kansas.

***Erythroneura univittata* new species.**

General ground color of anterior parts yellowish-white, of tegmina whitish-hyaline, with the following marks in very pale rose: vertex, streaks outlining a median vitta and two lateral spots. Pronotum, a median and two smaller spots. Scutellum, a spot at tip. A band arising in front of costal plaque and extending across tegmen, widening as it proceeds inward. A spot at tip of clavus and a streak along cubitus. A black spot behind costal plaque and another in base of cell M^4 .

Holotype; male, Cherokee Co., Kansas, December 30, 1923, R. H. Beamer.

Type deposited in the Museum of the University of Kansas.

***Erythroneura tricineta rubravittata* new variety.**

Vertex yellow with median dashes of red. Pronotum maroon except a small yellow spot in middle of anterior margin. Scutellum deep maroon in basal angles and light red or yellow at tip. Tegmina, ground color yellow with the

following marks in red: a broad band across middle ending in the large black area in each costal plaque. In this band the color is pale within and with dark margins. A broad vitta lies in base of clavus and there is a faint spot at tip. There is also a spot in base of corium. Longitudinal veins, especially cubitus, overlaid with red. Cross veins blackish; apical cells, excepting base, smoky to black.

Holotype; female, Cherokee Co., Kansas, December 30, 1923, R. H. Beamer. Type deposited in the Museum of the University of Kansas.

THE GENERA OF CULICIDAE OF NORTH AMERICA

BY ROBERT MATHESON,

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In my course on Medical Entomology at Cornell University, I have always emphasized the study of the Culicidae. The practical difficulties arose in attempts to present clear concepts of the genera composing the family. It is usually easy for students to differentiate the anophelines from non-anophelines. The problem arises with the other genera. In such work as mosquito control and mosquito extermination which is carried on in ever increasing amount by cities and towns, it is extremely important that the persons responsible for such work should know with what species they are dealing. It is very difficult to identify the various species of mosquitoes. This difficulty is increased by the generic distinctions given in most of the keys at present available. My students have always found their greatest problems in generic separation rather than in specific determination. So with great hesitation and doubts I attempted to work over all the characters previously offered and then search for new ones. In this work the first character studied was the arrangement of the bristles or spines on the pleura of the thorax. Using Snodgrass's¹ interpretation of the thoracic sclerites I was able to place these spines or bristles in definite groups which could then be used as characters in systematic work.

As a result of this I was able to prepare a key which during the past year has seemed in every way satisfactory.

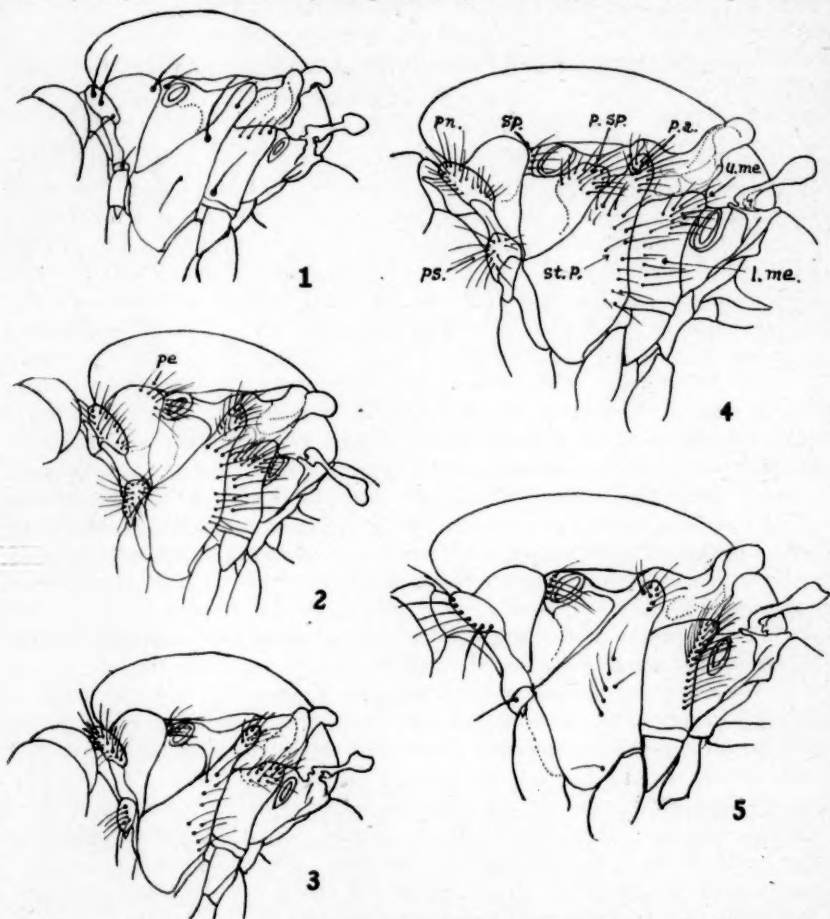
The work was just completed when there appeared an excellent paper by Edwards² (1921) on the mosquitoes of the Palaearctic Region. In this paper he made use of these characters and fortunately applied to them names which I have adopted.

As Edwards' paper is not easily accessible to many American workers and as I have used these characters more fully for our American genera, it seems worth while to offer this paper for criticism. Unfortunately, I do not have long series of the species of the various genera and it is to be hoped that those who do may correct mistakes or suggest modifications.

In order to make clear the terminology employed figures of the lateral views of the thorax of all the genera studied are given. These characters are not used in all cases but they are offered to call attention to the significance they possess in indicating generic relationship. I do not desire to enter here into a discussion of such relationship, but hope to do so in a forthcoming paper on the Culicidae of the Eastern United States.

1.—Snodgrass, R. E. In Howard, Dyar and Knab; The mosquitoes of the United States, Central America and the West Indies. Vol. 1: 55, 1912.
2.—Edwards, F. W. Bull. Ent. Res. 12: 263-351, Nov. 1921.

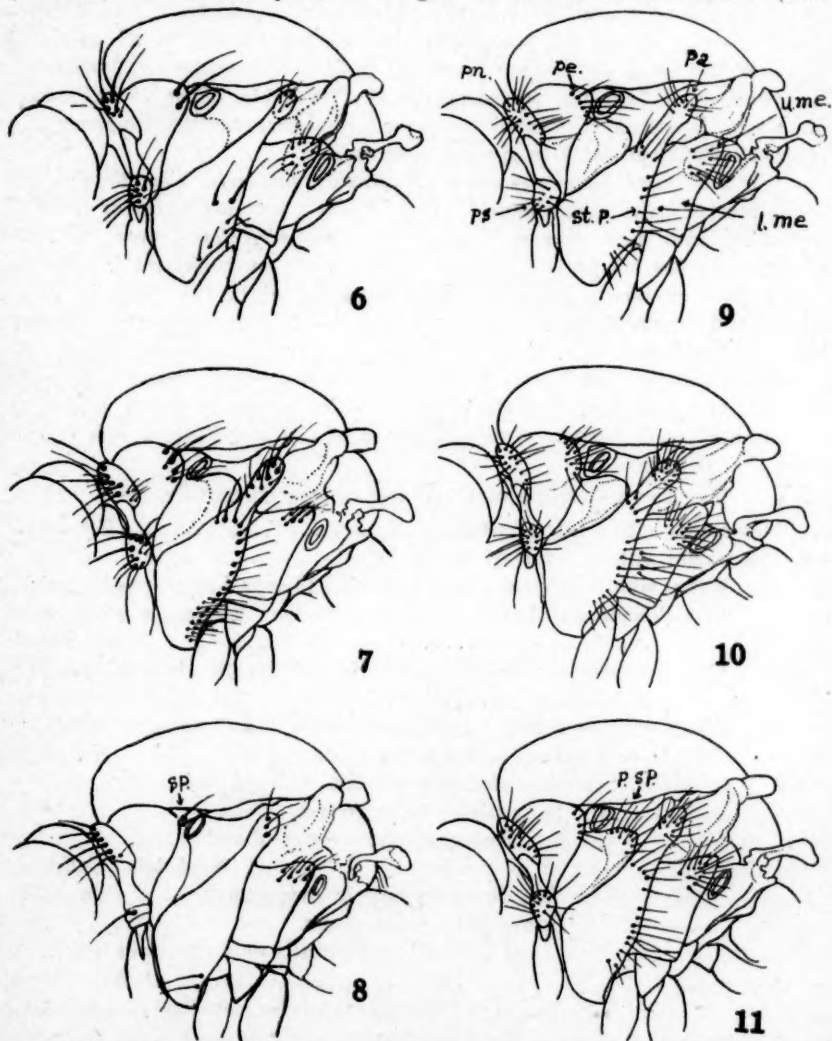
The chaetotaxy of the pleura of the thorax is easily observed when specimens are properly mounted. They should be pinned directly through the dorsum or mounted on points. When pinned through the side, even with *minutien nadeln* some of the spines may be destroyed. The pronotal lobe is provided with spines which may be numerous or only a few arranged in a definite row (*Megarhinus* and *Wyeomyia*) or scales may be present (some *Anopheles*). The prosternal



lobe is provided with many to few spines (one in *Megarhinus* and *Wyeomyia*). The proepimerum frequently bears a row of well marked spines on its posterior border. These spines are directed backward and project over the spiracle. The spiracular bristles are very important and need to be looked for with care. They are situated just behind the proepimeral ridge and in front of the spiracle. Sometimes they are numerous and prominent or they may be reduced to a single one (*Uranotaenia*). The post-spiracular bristles are situated behind the spiracle and are usually numerous when present. Their presence in *Aedes* renders it very easy to distinguish this genus from *Culex* and *Taeniorhynchus* (*Coquillettidia*). The other groups of spines do not seem to have so much importance but further study

may reveal generic significance. The location of the sternopleural bristles (St. p.) either in the center (as in *Megarhinus*) or along the posterior border (as in most of the other genera) may indicate generic position.

In employing these characters with generic significance two or three changes are involved which I think will place certain species logically where they belong. *Culex melanurus* Coq. has never seemed to me to fall in the genus *Culex* (*sens lat.*) It should be placed in the genus *Thecobaldia* Neveu-Lemaire (*Culi-*



seta Felt). The genitalia of the male place it in this genus and the larval characters certainly do. I have examined three larvae of this species and find that

3.—Howard, Dyar and Knab. The mosquitoes of the United States, Central America and the West Indies. Vol. 2, plate 52, 1912, and Vol. 3, p. 454, 1915.

Howard, Dyar and Knab³ have overlooked the pair of basal hair tufts on the air tube. The pair of hair tufts are rather small, placed close to the basal margin and between the pecten. Dr. Dyar (in personal correspondence) finds these basal tufts present in his material, they having been overlooked when the monograph was written.

The genus *Psorophora* is also an interesting one. In *Psorophora ciliata* Fab. the proepimeral bristles are absent. The entire proepimerum is bare except for one or two very small setae usually placed near the middle. In *Psorophora* (*Janthinosoma*) group the proepimeral bristles are present in all species I have examined (*sayi*, *discrucians*, *columbiae*, *signipennis*, *horridus* and *posticatus*). Unfortunately, I have no representatives of *Psorophora* (*Psorophora*) except *ciliata* for examination.* Should this prove a good character the sub-genus *Janthinosoma* should probably be given generic rank.

In the genus *Taeniorhynchus* (*Mansonia*) sub-genus *Coquillettidia* the post-spiracular bristles are absent. There is also a prominent row of three or four stout lower mesoepimeral bristles. In *Taeniorhynchus* proper the post-spiracular bristles are present and the row of lower mesoepimeral bristles are much reduced or absent. Edwards (1921) states that all the Palaearctic, African, Oriental and our single North American species belong in the sub-genus *Coquillettidia*. It would seem to me that *Coquillettidia* should be given generic rank. As a result of these studies I propose the following key, which seems to be quite diagnostic and should greatly reduce the difficulties in generic determination. I have not attempted to diagnose the sub-genera of *Culex* and *Aedes* which occur in the United States.

KEY TO THE GENERA OF CULICIDAE OF THE UNITED STATES

- A. Metanotum with a tuft of setae *Wyeomyia*
- AA. Metanotum without a tuft of setae.
 - B. Wings with the second marginal cell less than half as long as its petiole.
 - C. Proepimeral bristles absent; spiracular bristles, a strong row *Megarhinus*
 - CC. Proepimera with one stout bristle; spiracular bristles only one *Uranotaenia*
 - B. Wings with the second marginal cell over half as long as its petiole.
 - D. Scutellum rounded, not lobed. *Anopheles*
 - DD. Scutellum distinctly trilobed.
 - E. Spiracular bristles present.
 - F. Post-spiracular bristles absent. *Theobaldia* (*Culiseta*)
 - FF. Post spiracular bristles present *Psorophora*
 - EE. Spiracular bristles absent.
 - H. Proepimeral bristles only two stout bristles... *Orthopodomyia*
 - HH. Proepimeral bristles more than two, generally a strong row.
 - I. Post-spiracular bristles present. *Aedes*

*—I have since examined *Psorophora* (*Psorophora*) *howardii* Coq. and the proepimeral bristles are present in this species. I believe *P. howardii* Coq. should be transferred to the subgenus *Janthinosoma*.

II. Post-spiracular bristles absent.

J. Lower mesoepimeral bristles absent.

Deinocerites

JJ. Lower mesoepimeral bristles present.

K. Lower mesoepimeral bristles one,
rarely two. *Culex*

KK. Lower mesoepimeral bristles 3
or 4. *Taeniorhynchus*
(*Coquillettidia*)

KKK. Lower mesoepimeral bristles
numerous, at least 6 or more.

.....*Lutzia*

EXPLANATION OF FIGURES.

1. Lateral view of thorax of *Uranotaenia lowii* Theo.
2. Lateral view of thorax of *Theobaldia dyari* Coq.
3. Lateral view of thorax of *Anopheles punctipennis* Say.
4. Lateral view of thorax of *Psorophora ciliata* Fab.
5. Lateral view of thorax of *Megarhinus septentrionalis* D. & K.
6. Lateral view of thorax of *Orthopodomyia signifer* Coq.
7. Lateral view of thorax of *Deinocerites pseudus* D. & K.
8. Lateral view of thorax of *Wyeomyia smithii* Coq.
9. Lateral view of thorax of *Culex pipiens* Linn.
10. Lateral view of thorax of *Coquillettidia perturbans* Walker.
11. Lateral view of thorax of *Aedes vexans* Meig.

1. Me., lower mesoepimeral bristles; pn., pronotal group of bristles; pe, proepimeral group of bristles; pa, pre-alar group of bristles; ps, prosternal group of bristles; p. sp., post-spiracular group; sp., spiracular group; st. p., sternopleural group.

These abbreviations are not shown on each figure as the groups of bristles are easily recognizable.

REMARKS ON A MERMITHID FOUND PARASITIC IN THE ADULT MOSQUITO (*Aedes vexans* MEIGEN) IN B.C.

BY G. STEINER,

Bureau of Plant Industry, Washington, D. C.

The Mermithids described below were received from Mr. Arthur Gibson, Dominion Entomologist, Department of Agriculture, Ottawa, Canada, for identification. Mr. Gibson in a letter stated that the material was collected by Mr. Eric Hearle at Mission City, B.C., on July 7 and 19, 1921. The following four rather significant observations made by Mr. Hearle were also communicated by Mr. Gibson.

(1) On June 26, 1920, adults of the mosquito, *Aedes vexans* Meigen, were taken from *Spirea* plants by sweeping in the low foliage where they were feeding, and from breeding cages. Eighty per cent of the males and females dissected were infested. There were one to six nemas in the abdomen of each parasitized mosquito,—the usual number being two. In no female mosquito where the parasites were found were the ovaries well developed.

(2) During 1921, *Aedes vexans* was found to have a smaller percentage

of infestation,—about twenty per cent of these examined being parasitized.

(3) *Aedes aldrichi* Dyar taken at various times in 1920 from the same places in a similar manner showed no parasites; and although a number of dissections were made at various times, parasites were never revealed.

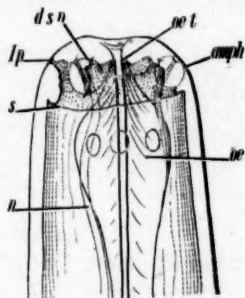
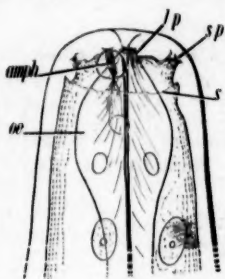


Fig. 1. *Paramermis canadensis* n. sp. Lateral view of a larval head end; amph, amphid or lateral organ; 1 p, lateral papilla; oe, oesophagus; s, edge formed by projecting hypodermic tissue; s p, submedial papilla.

Fig. 2. *Paramermis canadensis* n. sp. Dorsal view of a larval head end; amph, amphid or lateral organ; d s p, dorso-submedial papilla; 1 p, lateral papilla; n, tube probably formed by amphidial nerve and surrounding gland; oe, oesophagus; oe t, oesophageal tube; s, edge formed by projecting hypodermic tissue.

(4) In 1921, however, a single specimen of *A. Aldrichi*, taken at Hatzic, B.C., on June 19, out of 110 examined, was found to harbor a very small nema in the abdomen, which contained a considerable amount of blood. The ovaries were filled with 78 fully developed eggs. No effect was noticeable on the host.

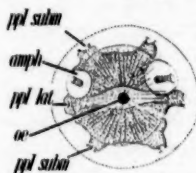


Fig. 3. *Paramermis canadensis* n. sp. Head of a larva with a less developed frontal convexity.

Fig. 4. *Paramermis canadensis* n. sp. Front view of a larval head end; amph, amphid or lateral organ; oe, oesophagus; ppl lat, lateral papillae; ppl subm, submedial papillae.

The writer has not seen this parasite from *Aedes aldrichi* Dyar and therefore is unable to state whether it was the same species as that found in *A. vexans* Meigen, or indeed, whether it was a Mermithid.

Many observations and facts support the theory that the members of the nema family of Mermithidae (which includes a series of different genera with at least several hundred species), plays a much more important role than might have been expected in the control of many kinds of insects, and some snails.

The present material comprises five specimens of the parasitic larval stage of a new form, which, with some hesitation, is placed in the genus *Paramermis*. Owing to the nature of the specimens, the following description is incomplete.

Paramermis canadensis n. sp.

Cobb's formula $\frac{0.03(7)}{0.5} \frac{?}{?} \frac{6.8(9)}{0.9} \frac{50}{15} \frac{?}{?} 17.335\text{mm}$

The body of the larva tapers to about one-fifth the body width toward the head end and the tail end, and has the form of figs. 6 and 7 with a more or less well-set-off horn-like caudal process. The

adult apparently has a tail end such as is shown in fig. 7 inside the partly shed larval moult.

In one specimen the cuticle showed cross fibers near the surface, a feature not characteristic of typical members of *Paramermis*; in the remaining specimens, however, these cross fibers could not be seen, perhaps on account of the rather bad state of preservation.

The bluntly rounded head end, without protuberances, is not set off. There are no lips; but the specimens showed a certain amount of difference with regard to the height of the front part of the head, the specimen shown in figs. 1 and 2 being perhaps more affected by the action of the fixative than that shown in fig. 3. The six papillae are not elevated over the surface; there seem to be two end

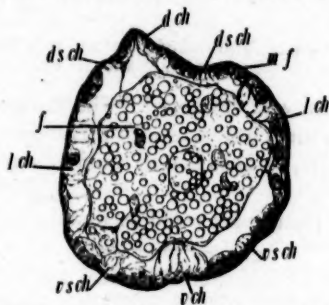


Fig. 5. *Paramermis canadensis* n. sp. Cross section through the body of a larva at some distance behind the nerve-ring (freezing microtome); d ch, dorsal chord; d s ch, dorso-submedial chord; f, fat body; l ch, lateral chord; v ch, ventral chord; v s ch, ventro-submedial chord.

organs, submedial as well as lateral. The comparatively large spherical-shaped amphids are shifted dorsad and orad, so that their position is somewhat in front of the papillae; terminals forming a closed bundle could be seen inside. These terminals are presumably connected with nerve fibers reaching the amphids at their inner bottom. No dorsal commissure could be seen between the two amphids. This fact and the above-mentioned probable presence of cross fibers in the cuticle, make it somewhat doubtful whether the present species belongs to the genus *Paramermis*.

Behind the head papillae a collar-like elevation of the hypodermical tissue is formed.



Fig. 6. *Paramermis canadensis* n. sp. Tail end of a larva.

The mouth opening is terminal; neither a vestibule nor a spear could be seen. The oesophageal tube is, at least in its oral portion (figs. 1-3), surrounded by well developed oesophageal tissue which forms a bulbous swelling. Unfortunately this apparently highly interesting structure could not be followed farther back; in one specimen it looked as if there was an oesophagus very similar to that of

other nemas.

Cross sections showed the presence of six longitudinal chords, having four longitudinal series of cells; of these chords the lateral ones are the largest, the ventral and dorsal ones of about the same diameter, and the submedial also of

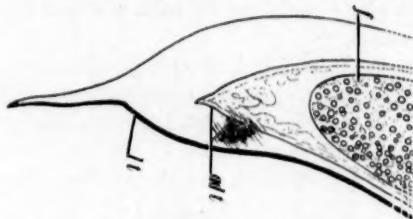


Fig. 7. *Paramermis canadensis* n. sp. Tail end of a larva in moulting stage; ad t, tail end of the adult after the moult; f, fat body; l t, larval tail with the horn-like caudal processus somewhat set off.

about equal size and rather well developed. The so-called fat body consists apparently of cells which in some instances may surround an axial cavity. Numerous somewhat opaque bodies, perhaps nuclei, could be seen between the "globules" of nerve material.

No trace of an excretory pore could be found.

NEW COLEOPTERA FROM SOUTHERN FLORIDA WITH NOTES ON OTHER INTERESTING SPECIES

BY W. S. BLATCHLEY,
Indianapolis, Ind.

During the winter of 1922-23 I made a trip to South America and did not reach my winter home at Dunedin, Fla., until March 14. From then until April 14 I was in the field about that region every day and secured a number of Coleoptera new to my collection, a few of which are new to science. These and other undescribed or scarce species from different points in Southern Florida, some of which have been on hand for several years, are treated in the following pages.¹

***Tachys subpunctatus* sp. nov.**

Elongate oval, subdepressed. Uniform pale reddish-brown, strongly shining; antennae dusky towards tips; legs pale brownish-yellow. Head not inserted in thorax to eyes, as wide across them as front margin of thorax. Antennae less than half the length of body. Thorax subquadrate, sides broadly rounded, subparallel at extreme base, which is distinctly narrower than apex; median line subobsolete; basal transverse impression not tripunctate. Elytra elongate-oval, scarcely wider at base than thorax at middle, sides subparallel or just visibly curved from base to behind middle, thence gradually converging to the rounded tips; disk with sutural stria entire, not punctate, its short recurved portion parallel to suture; remaining striae obsolete, but, when viewed from the side in a certain light, represented by rows of rather large, close-set vague punctures. Dorsal punctures small, the first in front of middle, the second at apical third. Length 2.1 mm.

Described from a single specimen taken April 2nd from the mucky margin of a small pond near Dunedin. Belongs to Group IV of Hayward, and allied to

¹In the notes that follow the sequence and nomenclature is that of Leng's "Catalogue of Coleoptera."

both *incurvis* and *dolosus* but paler and more shining than either, and differing in having the base of pronotum distinctly narrower than apex and in the rows of elytral punctures which are almost invisible from above.

Agabus johannis Fall.—This, the only *Agabus* known from Florida, occurs quite frequently in the stagnant water of ditches and the borders of small lakes near Dunedin. It was formerly recorded by me² as *Agabus semivittatus* Lec., with which species it was confused by Sharp and other authorities on Dytiscidae. Mr. Fall, in his recent paper³, has separated the two, his types of *johannis* from the British Museum, having been originally taken at St. John's Bluff, Fla.

Arthrolips splendens (Sz.)—Three specimens of this handsome little Corylophid were beaten from the foliage of a recently felled pine, one mile north of Dunedin on April 8. The types of Schwarz⁴ were from Tampa and it has since been taken at Key West and Biscayne Bay. In the original description the length, by an error of the printer, was given as 7 mm., whereas it should be .7—1. mm.

Photinus collustrans Lec.—In his original description⁵ of this species Leconte states that the prothorax is "sparsely punctulate," and he gives the length of his type males at 7.2 mm. In a male at hand from Istokpoga the apical fuscous portion, which occupies nearly one-third the length of pronotum, is densely punctate and the length is 10 mm. It was described from Tampa and Enterprise, but Schwarz (MS.) mentions it from several other localities in Florida. Known elsewhere only from Texas.

Photuris pennsylvanica lineaticollis Dej.?—Following his description of *Photuris pennsylvanica* (DeG.) Leconte says:⁶ "In southern specimens the pale discoidal vitta of elytra is occasionally wanting; these are *Photuris lineaticollis* of DeJean's Catalogue." I have at hand two examples of *Photuris* taken at Eustis, Fla., April 6, which evidently belong here, but they differ from *pennsylvanica* (DeG.) not only in having the median discoidal stripe wanting, but in the disk of elytra being a much darker brown, and the antennae wholly piceous-brown, whereas in *pennsylvanica* each joint is pale at base and tip. The length is 14 mm., or longer than the average *pennsylvanica*. If the differences mentioned hold good in all southern specimens, they should be regarded as a distinct variety if not species. In his later "Synopsis of the Lampyridae"⁷ Leconte placed them as var. "a" of *pennsylvanica*, but both Henshaw and Leng in their Check List and Catalogue, have ignored the form.

***Tytthonyx furtiva* sp. nov.**

Elongate, slender. Dull fuscous-black, thickly clothed with short appressed grayish hairs. Head, except occiput, scutellum, prosternum and side margins of meso- and metasterna, yellow; thorax yellow with a broad, dusky line each side of the deeply impressed median line. Antennae three-fourths the length of body, strongly serrate, second joint one-third the length of third, the latter much shorter than fourth. Thorax one-half wider than long, front margin truncate, hind one broadly rounded into the sides which are straight and parallel from middle to the rectangular front angles; disk impunctate but with a distinct circu-

2.—Bull. Amer. Mus. Nat. Hist., XLI, 1919, 314.

3.—Review of N. Amer. species of *Agabus*, 1922, 10.

4.—Proc. Amer. Phil. Soc. XVII, 1878, 357.

5.—Proc. Amer. Phil. Soc., 1878, 407.

6.—Proc. Acad. Nat. Sci. Phil., 1851, 337.

7.—Trans. Amer. Ent. Soc. IX, 1881, 37.

lar impression on the outer side of each of the dark median lines. Scutellum heart-shaped, its apex with an obtuse median notch. Elytra reaching second ventral, their tips separately rounded; disk of each with two vague carinae, the intervals finely rugosely granulate. Length 4.8 mm.

Dunedin, April 11; taken by beating in Skinner's hammock. Differs from our other three known species by the narrower pronotum with rectangular front angles and the yellow heart-shaped scutellum.

Melanotus clandestinus (Er.).—Dunedin, April 11, one specimen taken while beating in the same hammock. Leng does not include Florida in his distributional notes, but it has been recorded⁸ by Wickham from St. Petersburg and Tampa.

Nematodes atropos (Say).—Two specimens taken by beating dead limbs in the same hammock, March 23-29. Schwarz (Ms.) mentions it from Crescent City. No other Florida record.

Melanophila notata opaca Lec.—I cannot agree with Leng who, in his Catalogue, makes this an absolute synonym of *notata*. Aside from color, it being always devoid of spots, it is a large broader form with elytra more coarsely granulate-punctate and hind angles of thorax with a distinct short fine carina, mentioned by Leconte in his original description, but never present in typical *notata*. It is more likely to prove a distinct species than a synonym, but is best held at present, as Henshaw placed it, as a variety of *notata*. Four examples of this var. *opaca* are at hand, three from Dunedin and one from Ormond.

Actenodes acornis (Say).—A single specimen of this Buprestid was taken March 26 while beating in Skinner's hammock, northeast of Dunedin. Another is in my collection from Ormond. The only record of its occurrence in the State is that of Castle and Laurent⁹ at Jacksonville.

***Scirtes ovalis* sp. nov.**

Broadly oval, subdepressed. Above a uniform rather pale reddish-brown, thickly clothed with moderately long appressed yellowish hairs, under surface slightly darker, the abdomen and femora tinged with fuscous. Head beneath without a suborbital ridge. Antennae slender, the second and third joints subequal in length, the second the stouter, the two united scarcely equal to fourth. Entire upper surface finely, densely aciculate-punctate, each puncture bearing a hair; under surface and femora similarly punctate, the hairs shorter. Length 3-3.5 mm.

Described from a half dozen specimens taken by H. C. Fall and myself on the ground beneath a sphagnum-like moss growing by the side of a road-side ditch, three miles east of Dunedin. Relatively broader, more depressed and much paler than our northern *tibialis*, the pubescence of upper surface more dense.

***Scirtes piceolus* sp. nov.**

Oblong-oval. Above wholly dark piceous-brown, strongly shining, almost devoid of pubescence; sutural and side margins of elytra narrowly paler; antennae dusky brown, paler at base; under surface dull reddish-brown, irregularly mottled with fuscous, minutely pubescent, the legs somewhat paler. Second and third antennal segments very short, united scarcely equal to fourth. Head and thorax almost impunctate. Elytra densely, finely and shallowly punctate. Length 2.5 mm.

8.—Bull. Buff. Soc. Nat. Sci., IX, 1909, 401.

9.—Ent. News, VIII, 1897, 8.

Dunedin, February 22. Taken by sweeping herbage about the border of Jerry Lake. More oblong and less convex than *orbiculatus*, the punctures of elytra much more dense and devoid of hairs, except a few scattered ones on humeri and near hind angles of thorax.

***Languria erythrocephalus* sp. nov.**

Elongate, subcylindrical. Head, thorax, scutellum and under surface red, minutely alutaceous, finely and very sparsely punctate; apex of last ventral black; elytra bluish-black, in some specimens with a reddish tinge along the suture; femora black, reddish at base; antennae, tibiae and tarsi piceous. Antennae more slender than in allied species, club 5-jointed, joint 7 but slightly wider than 6, 8-10 gradually increasing in width, 11 oval, narrower than 10. Thorax nearly two-thirds longer than wide, sides feebly sinuate at basal fourth, thence almost straight to apex. Elytra not wider at base than thorax; sides regularly and very gradually tapering to apex; striae not impressed, marked with close-set punctures, these obsolete near apex; intervals smooth. Length 8-10.5 mm.

Described from eight specimens taken March 2, 1922 by sweeping weeds along the margins of a drainage ditch at Moore Haven. Resembles *L. marginipennis* Sz. but the latter has the head black, more coarsely punctate, joints of antennal club much wider and epipleura in great part red.

***Hyperaspis nigropennis* sp. nov.**

Broadly oval, strongly convex. Black, shining; side margins of thorax above and beneath rather broadly reddish-yellow; elytra without spots; front femora except under side, tips of middle and hind ones and all the tibiae and tarsi reddish-brown. Entire upper surface finely evenly, rather sparsely punctate. Elytra widest at middle, their tips broadly and bluntly rounded. Length 3 mm.

Dunedin, March 28. Taken while beating in a dense moist hammock. The immaculate black elytra, taken in connection with the broad reddish-yellow side margins of thorax, easily distinguish this from all our known species.

***Hyperaspidius flavocephalus* sp. nov.**

Oblong-oval, convex. Head, thorax, except at base, narrow humeral margin of elytra and front and middle legs, clear yellow; basal margin of thorax, except the angles, and elytra, except humeral margin, shining black; meso- and metapleura and basal ventral segments piceous-black; hind legs and last two ventrals reddish-brown. Head flat, wider than long, almost vertical, minutely and sparsely punctate. Thorax more than twice as wide as long, side margins feebly curved; disk very finely, shallowly and rather sparsely punctate. Elytra conjointly oblong-oval, at base slightly narrower than middle of thorax; umbones feeble, disk sparsely, minutely aciculate-punctate. Under surface densely, rather finely, rugosely punctate, each puncture bearing a fine gray appressed hair. Pygidium in great part exposed, finely and densely granulate-punctate. Length 2 mm.

Dunedin, March 27. Taken by sweeping low herbage along the bay front.

Delphastus pallidus (Lec.).—This minute pale coccinellid occurs sparingly about Dunedin, November-April, hibernating in bunches of Spanish moss, and in spring found on oak and foliage of low herbs near ponds. It was described¹⁰ from a unique taken at Sand Point, Fla., and has not since been recorded.

10.—Proc. Amer. Phil. Soc., 1878, 400.

Zophobas morio (Fabr.).—A number of specimens of this large Tenebriod have been recently sent me from Chokoloskee, where they were taken beneath a house close to the beach. Schwarz, in his "Coleoptera of Florida," states: "Occurrence very doubtful, mentioned by Dr. Horn on specimens from the Bahamas." In his later MS. notes he mentions its occurrence at Key West, where it was taken by Morrison.

Microzogus insolens Fall.—This minute Ptinid, described ¹¹ from Key West and Biscayne Bay, and hitherto known only from those two stations, occurs quite frequently near Dunedin, both on the foliage of the buttonwood, *Conocarpus erecta* L., a sub-maritime shrub, and on ferns in dense hammocks.

Catorama sectans Lec.—One specimen taken near Dunedin, January 21, from beneath the bark of a recently felled pine. Known hitherto only from Texas.

Cryptorama minutum (Lec.).—Taken at Everglade, March 14, by beating a species of *Crataegus*. Described ¹² from Enterprise, Fla., and recorded from no other station in the State, though known also from Texas and Oklahoma.

Ptilinus ruficornis (Say).—A single specimen was beaten from a mass of dead vines near Dunedin, on March 28. Not before recorded south of West Virginia. The four species of Ptinidae above mentioned were identified for me by H. C. Fall.

Bostrichus bicornis (Web.).—Three specimens were taken at Dunedin March 27 by beating the foliage of the wax-myrtle, *Cerothamnus ceriferus* L. Known from the State heretofore only from Enterprise and St. Augustine.

Leptostylus arcuatus Lec.—On April 9 a half dozen specimens of this Lamiinid were beaten from the leaves of some recently felled pines one mile north of Dunedin. It was described ¹³ from a single specimen taken at Tampa and I can find no definite locality record of its occurrence elsewhere, although Casey's *L. lecontei* ¹⁴ from Ft. Worth, Fla. is probably a synonym. Leconte gave the length at 8 mm., but it ranges from 7.5 mm., male, to 11 mm., female.

Astylopsis (*Leptostylus*) *guttata* (Say).—This species was beaten in small numbers from the same trees as was *L. arcuatus*. It has not before been recorded south of South Carolina.

Xanthonia villosula Melsh.—A single specimen was taken at Dunedin, March 18, by beating wax-myrtle. Not before recorded south of Georgia.

Fidia longipes (Melsh.).—A specimen is at hand taken June 21 by P. W. Fattig at Gainesville. The first record for the State.

Metachroma luridum (Oliv.).—Known heretofore only from South Carolina and Georgia. Specimens are at hand from Eustis, April 7, beaten from oak, and Dunedin, March 29-July 1, on the latter date at porch light.

***Metachroma robusta* sp. nov.**

Oblong-oval, robust, convex. Color a nearly uniform pale brownish-yellow, strongly shining, the thorax slightly darker than elytra; joints 7-11 of antennae, apical third of tibiae and tarsi fuscous. Head and thorax minutely alutaceous, very finely and sparsely, almost invisibly punctate, the clypeo-

11.—Trans. Amer. Ent. Soc., XXXI, 1905, 135.

12.—Proc. Amer. Phil. Soc., XVII, 1878, 409.

13.—Proc. Amer. Phil. Soc., 1878, 414.

14.—Mem., IV, 1913, 305.

frontal suture wholly wanting. Thorax transverse, convex, nearly twice as wide as long, its side margins very narrow, almost straight. Elytra slightly wider and about two and a half times longer than thorax; disk convex, striae unimpressed but with regular rows of relatively coarse punctures, these separated by a distance equal to their own diameters and becoming finer near apex. Abdomen finely and sparsely punctate, each puncture bearing a rather long appressed yellowish hair. Hind femora unarmed. Length 3.5 mm.

Fort Myers, Fla., April 20. Collected by W. T. Davis, New Brighton, Staten Island, N. Y.; type in his collection. Belongs under No. 8 of Horn's Key,¹⁵ but differs from the others there found by its uniform pale color, convex form, regular rows of coarse elytral punctures, etc.

***Metachroma strigicollis* sp. nov.**

Allied to *quercatum* (Fabr.) but smaller and more oblong. Head, elytra, antennae and legs a uniform reddish-brown; thorax and under surface chestnut-brown. Head minutely alutaceous, finely, sparsely punctate, the clypeo-frontal groove evident but fine. Thorax subelliptical, one-half wider than long, sides rounded into base, disk finely rather densely strigose-punctate and with a vague interrupted smooth median line. Elytra not alutaceous; sides parallel from base to apical third, thence broadly rounded to apex; disk with striae not impressed, more coarsely and distinctly punctate than in *quercatum*. Under surface minutely alutaceous, impunctate. Hind femora unarmed. Length 3 mm.

Described from two specimens taken at Dunedin March 21 and April 11, at porch light. The smaller more parallel form, wholly pale antennae and uniform reddish-brown non-alutaceous elytra, with striae punctures distinctly coarser, separate this from *quercatum*.

Hypolampsis pilosa Ill.—In his list of Florida Coleoptera, Schwarz includes this from Tampa as "very rare." It has since been taken by others at St. Petersburg and Enterprise. About Dunedin it occurs in small numbers in March and April on weeds and grasses along the margins of ponds and hibernates in bunches of Spanish moss.

***Disonycha albida* sp. nov.**

Rather broadly oval. Body above and beneath a uniform ivory-white; antennae black, the basal joint pale; apical half of tibiae fuscous; tarsi piceous, the pulvilli white. Antennae less than half the length of body, very stout for the genus; joints 2-4 gradually increasing in length, the fourth more than twice the length of second and longer than fifth, 5-10 subequal, thickly and finely pubescent with appressed brown hairs and with scattered erect ones, 11 oval, pointed. Upper surface glabrous, impunctate. Thorax more than twice as wide as long, base bisinuate, obtusely emarginate at middle; sides broadly obliquely curved, front angles obtuse, slightly lobate. Elytra not wider at base than thorax, humeri rounded, umbones obsolete. Abdomen and femora rather finely, sparsely, shallowly punctate, minutely pubescent. Length 7.6 mm.

Type in collection of W. T. Davis, taken by him on Big Pine Key, Fla., September 19, 1913. The uniform pale color with stout black antennae easily distinguish it from all other species of the genus.

Mylabris (Bruchus) ochraceicolor Pic.—This is the *Bruchus ochraceus*

15.—Trans. Amer. Ent. Soc., XIX, 1892, 211.

Schaeff., described from Brownsville, Texas and known only from that State. His name was preoccupied. Specimens are at hand from Ormond and Long Key, Fla. The one from Long Key was taken from beneath a board on the ocean beach.

Mylabris (Bruchus) obtectus Say.—I can find no definite record of this well known cosmopolitan "bean weevil" from Florida. A number were taken, March 28, from a small sack of beans in my residence.

Mylabris (Bruchus) hibisci (Oliv.)—Not before recorded from Florida. Specimens are at hand from Bassenger and Palmdale, where they were swept from the foliage of *Hibiscus spiralis* Cav., growing along the banks of streams. They differ from Indiana examples in having joints 7--11 of antennae blackish, and only the basal third of hind femora dark.

Mylabris (Bruchus) aequalis Sharp.—A single specimen of this little Bruchid was swept March 26, from low herbage north of Dunedin. It is a Neotropical form, known in the United States hitherto only from Texas.

Zabrotes subnitens Horn.—A number of examples have been taken about Dunedin in early spring by sweeping dwarf huckleberry and other low herbage. One specimen was beaten from Spanish moss at Lakeland and another is at hand from Crawford County, Indiana. Not before recorded from either Florida or Indiana.

THE ODONATA OF THE THUNDER BAY DISTRICT, ONTARIO.

BY E. M. WALKER

University of Toronto, Toronto.

Since the year 1907 when the writer first visited Nipigon and Fort William, Ont., he has examined a considerable number of dragon flies from Thunder Bay District, comprising several collections, which taken together are believed to include most of the species found in this region; and though doubtless still far from complete, the list of species seems worthy of placing on record.

The collections are as follows:—

(1) Small collections made by the writer at Nipigon and Fort William from August 26 to 30, 1907, August 4 to 10, 1910, and on June 18 and 19, 1913.

(2) A larger collection made by Mr. T. B. Kurata and the writer at Orient Bay, Lake Nipigon, July 12 to 24, 1920.

(3) A considerable number of specimens collected by Mr. N. K. Bigelow of the Ontario Fisheries Research party during the seasons of 1921, 1922 and 1923 at Orient bay and a few other stations on Lake Nipigon.

(4) Nymphs and a few adults collected by other members of the Ontario Fisheries Research party at Lake Nipigon, 1921—1923, including specimens from the stomachs of sturgeon, suckers and wild duck (American Golden-eye).

(5) A large number of specimens in the collection of the Carnegie Museum, Pittsburgh, collected at Orient Bay, Ombabika Bay (north end of Lake Nipigon), Longuelac (C.N.R., on Long Lake) and other localities mainly by Mrs. G. K. Jennings.

The Thunder Bay District lies within the Canadian Zone and is still largely covered with virgin forests, chiefly of the subarctic coniferous type. Like other portions of the great Archaean region of Canada it abounds with

lakes and streams, ponds and bogs, and is therefore a favourable region for such species of Odonata as can withstand the severity of the climate.

The general features of the country, its climate, topography and forest types, are sketched in an interesting manner by O. E. Jennings in several papers dealing with the Pteridophytes and Mosses of the region,¹ while an excellent account of the limnology and faunal characteristics of Lake Nipigon from the standpoint of fishery problems, by W. A. Clemens and others, is contained in the Publications of the Ontario Fisheries Research Laboratory, XI-XVI.²

The general character of the Odonate fauna is boreal, there being a predominance of species, or of individuals of certain species, of such genera as *Coenagrion*, *Aeshna*, *Cordulia*, *Somatochlora*, *Leucorrhinia* and *Ophiogomphus*. A week or ten days' collecting in a limited area like Orient Bay leaves the impression that the number of resident species is small, but the actual number of species represented in the combined collections is, on the contrary, unexpectedly large. Some of these are apparently very local, Lake Nipigon being probably at about the northern limit of many of the species that are common in the Muskoka District and Algonquin Park, e. g., *Ischnura verticalis*, *Hagenius brevistylus*, *Didymops transversa*, *Macromia illinoensis* and *Helocordulia uhleri*, while some of the most abundant species of the latter region, such as *Agrion maculatum*, *Argia moesta*, *Enallagma exulans*, *E. carunculatum*, *Neurocordulia yamaskanensis* and *Tetragoneuria cynosura simulans*, have not been taken in any part of the Thunder Bay District.

In the following notes frequent reference is made to two streams flowing into Orient Bay, the Pustagone River and Bear Creek, the former on the east side of the Bay, about a mile south of Macdiarmid, the latter on the west side a short distance above Nipigon Lodge.

The Pustagone River is a mere creek, navigable by canoe for but a few hundred yards, and its dragonfly life extends only a short distance farther up, since it soon becomes too rapid and heavily shaded even for *Agrion* and *Cordulegaster*. The lower part of the non-navigable portion is a succession of rapids and pools, and is followed by a broader, shallower stretch of riffles, below which the stream becomes deeper and quieter, flowing between wooded banks and finally winding out through open marshes to the outer Bay. Joining its lower part on the north side is a tributary which can be followed as far by canoe as the main stream, but comes to an abrupt end. It is free from rapids, having in fact scarcely a perceptible current. It is several yards wide in its upper part, where its banks are thickly wooded, but narrows to a few feet in width where it winds through the marsh.

About the edges of the pools between rapids were found the exuvia of *Ophiogomphus* and *Gomphus brevis*, and a few adults were taken nearby in sunny openings in the woods. *Boyeria grafiana* was also found transforming here and its nymphs were dredged from the stream.

1.—Jennings, C. E. Notes on the Pteridophytes of the North Shore of Lake Superior, Amer. Fern Journ. 3: 38-48, June, 1913; Notes on the Pteridophytes of Northwestern Ontario, Amer. Fern Journ. 5: 33-39, May, 1915; Notes on the Mosses of Northwestern Ontario. I, *Sphagnum*, Bryologist 21: 69-78, Sept., 1918. (The last paper contains a useful sketch-map of the region explored by the author and Mrs. Jennings and several photographs showing typical forest conditions.)

2.—University of Toronto Studies, Biological Series, No. 22, 1923, and No. 23, 1924.

Agrion aequabile hudsonicum, *Cordulegaster maculatus* and *Somatochlora minor* also flew over the shadier parts of the main stream where the current was considerable. Nymphs of *Aeshna umbrosa* were also taken here, and a single adult of *Helocordulia uhleri*, found in the woods nearby, probably also came from this part of the stream.

In the open marsh about the mouth of the stream the dragonfly life was of course quite different, the prevailing species being *Coenagrion resolutum*, *Nehalennia irene*, *Enallagma boreale*, *E. hageni*, *Leucorrhinia proxima* and *L. hudsonica*, *Aeshna cremita* and *A. canadensis*. Exuvia of *A. interrupta* were also found, and a few adults of *Somatochlora williamsoni*, which was also observed flying over the broader part of the tributary stream, this being a characteristic type of haunt for this species. It was too quiet here for *Cordulegaster* and the Gomphines.

Bear Creek is navigable for about two miles from its mouth and on this part of its course is a quiet stream, devoid of rapids or even riffles, although, in following this part of its course from the mouth to the rapids, where it terminates, some increase in the current was observable, and the dragonfly fauna changes accordingly. The lower reaches of Bear Creek are very sluggish and tortuous and there are many open marshes bordering its banks. The commonest dragonfly on this part of the stream appears to be *Cordulia shurtleffi* which shows a decided preference for sluggish waters and may frequently be seen from the canoe, as it patrols the edges of the creek. *Aeshna cremita* was also frequently seen but is less confined to the marshes than *A. canadensis*. The Leucorrhinias, Coenagrions and Enallagmas were frequent but are much less abundant in these cold, northern marshes than are the corresponding species in more southern latitudes. *Nehalennia irene* also occurred in the marshes in small numbers. Farther up stream, where the current was more noticeable. *Cordulegaster maculatus* and *Somatochlora minor* became prevalent species, particularly towards the foot of the rapids. *Aeshna cremita* is also common everywhere and *A. umbrosa*, which was just beginning to appear, was doubtless a common species later in the season. Other species taken on this creek are mentioned in the list.

ANNOTATED LIST OF SPECIES

1. *Agrion aequabile hudsonicum* (Hagen). This species was seen in small numbers, flitting along the banks of the Pustagone, during July, 1920. Only two specimens were captured, a male on July 14 and a female on July 19. Two nymphs, apparently belonging to the penultimate and antepenultimate stages, were also taken from this stream by the Ontario Fisheries Research party.

I have a distinct recollection of having had a glimpse of *Agrion maculatum* (Say) at Nipigon in 1907, but failed to capture it or make any note of it. It seems to be absent from the streams about Orient Bay.

2. *Lestes uncatus* Kirby. There are 2♂ and 2♀ of this species in the Carnegie Museum collection, taken by Mrs. Jennings at Current River, near Port Arthur, on August 2, 1912.

3. *Lestes disjunctus* Selys. This species was common about a few small ponds or puddles in the clay ditch along the railway, near Macdiarmid (Orient Bay) on July 21, 1920. Adult males and teneral, some just emerged, were seen. The occurrence of this species in sun-warmed puddles is contrary to my exper-

ience farther south and probably indicates a change of habitat, due to the cool climate of this region. One or two teneral females, however, were observed two days later in the marsh bordering Bear Creek and it may have become commoner there after we left. I also have a female from Nipigon, taken on August 29, 1907, and another from Black's Sturgeon Lake, July 20th, 1922.

4. *Nehalennia irene* (Hagen). This small damselfly was not rare in marshes about Orient Bay, but was not found in anything like the abundance in which it occurs farther south. It was taken in marshes on Bear Creek, at the mouth of the Pustagone and in several other similar open marshes, from July 16 to 19, 1920. There is also a specimen in the Carnegie Museum from Silver Islet, July 7-12, 1913 (Mrs. Jennings).

5. *Coenagrion resolutum* (Hagen). Common in open marshes and marshy borders of streams; Bear Creek, Pustagone River, and about several small lakes south of Orient Bay, July 16-19, 1920. We also found it common at Nipigon on June 18-19, 1913.

6. *Coenagrion interrogatum* (Selys). I first met with this species at Nipigon on June 19, 1913, when a pair was taken in copula. In 1920 we found it to be fairly common in open marshes on Bear Creek and some of the small lakes south of Orient Bay, associated with the preceding species. Several pairs were observed in copula on July 18.

7. *Enallagma boreale* Selys. Common in all open marshes, marshy stream-banks and lake shores in the vicinity of Orient Bay, July 16-24, 1920. The most common damselfly of the region. It was also taken at Nipigon on August 8, 1910.

This is the species long known as *E. calverti* Morse. The identity of these species has long been suspected, but as de Selys' description of the female of *boreale* does not fit the majority of specimens of this species in all respects, the matter has remained unsettled. After examining a number of females of both *calverti* and *cyathigerum* from many localities I find that the characters by which de Selys separated *boreale* and *cyathigerum* vary in the same manner. No characters for separating the females of these two species have been found and, as the description of the male of *boreale* clearly applies to the species known as *calverti*, the latter name must fall into the synonymy.

8. *Enallagma cyathigerum* (Charp.). This species was not met with at Orient Bay but was common at Nipigon on August 8, 1910, and on June 18-19, 1913. It is also represented in the collection of the Carnegie Museum by a male from Current River (near Port Arthur), taken by Mrs. Jennings.

9. *Enallagma hageni* (Walsh). This species was found in the vicinity of Orient Bay in the same situations as *E. boreale* but was somewhat less common and more local. Specimens were taken from July 16 to 19, 1920. It was also taken at Loch Lomond, near Fort William, August 2, 1910, and at Nipigon on August 8 of the same year. One of the Nipigon males has the black areas of the abdomen almost as extensive as in *E. geminatum* or *exsulans*.

The Carnegie Museum contains a male from Nipigon taken by Mrs. Jennings on July 4, 1912.

10. *Ischnura verticalis* (Say) I found this species at Nipigon in 1910, but have no record as to its numbers and have only 2 males taken on August 6

and 8. While at Lake Nipigon in 1920 only a single male was taken on the shore of a small lake, just south of the lower end of Orient Bay on July 18, 1920. No others were seen at any time and it is probably very near its northern limit here.

11. *Cordulegaster maculatus* Selys. This species was common on Bear Creek for some distance below the rapid, where there is a more or less perceptible current. Farther down, where the creek is very sluggish, it was less frequently seen. It was observed from July 16 to 24, 1920. On July 16 several ovipositing females were seen. They flew up and down within a foot or so of the water, the abdomen held in a vertical position, being dipped below the surface in the manner described by Kennedy for *C. dorsalis*.

C. maculatus was also taken on the Pustagone on July 22, and was not uncommonly seen here patrolling the lower part of the creek over the shallow rapids and the smoother water below them. An exuvium was found here on July 17. A female was taken by Mr. Bigelow at White Sand, Lake Nipigon, on July 13, 1922.

The Carnegie Museum contains two males and a female from Orient Bay and 2 males from "Frazer Creek, Alexander Portage" July 10, 1912, taken by Mrs. Jennings.

12. *Ophiogomphus colubrinus* (Selys). I first captured this species in open woods at Nipigon on August 9, 1910. A male and female were taken and several others seen. A few exuvia were also found on the shore of the Nipigon River, near the C.P.R. bridge, where there is a considerable current. At Lake Nipigon I took only one specimen, a female, captured in a small clearing close to the rapids of the Pustagone on July 23, 1920, but Mr. Bigelow took it at two other localities, on the lake Grand Bay (1♂, August 23, 1921) and Wabinosh (1♀, July 28, 1923).

I also have a female, newly emerged, and two exuvia from Black Sturgeon Lake, July 20, 1922, and 3 exuvia from Bear Creek, July 18, 1921, taken by other members of the Ontario Fisheries Research party. Two immature nymphs of an *Ophiogomphus*, perhaps this species, were also taken at the last-named locality.

In the Carnegie Museum there are 2 males and 1 female from the north end of Lake Nipigon, taken between August 12 and 22, 1914, another female from Ombabika Bay, and a male from St. Ignace Island, L. Superior, Sept. 4, 1912, all taken by Mrs. Jennings.

13. *Ophiogomphus rupinsulensis* (Walsh). Two males were captured by the writer in a sunny opening in the woods close to the Pustagone River, July 14, 1920. Numerous exuvia of this species, together with *Gomphus brevis*, were found on the banks of the stream. It is only three or four yards wide here but has considerable current. Young nymphs of *Ophiogomphus*, probably this species, were taken in the same stream by members of the Fisheries Research party, and 3 adult males were taken at Macdiarmid by Mr. Bigelow on June 16, 1921.

14. *Ophiogomphus anomalus* Harvey. Teneral adults (3 males and 3 females) and numerous exuvia were found by Mr. S. Logier of the Fisheries Research party at Three Mile Rapids, Gull River, on July 10, 1922. Mr. Logier states that he observed individuals transforming.

Five males and three females of this species are in the Carnegie Museum collection, captured by Mrs. Jennings in "clearings, Oliver Creek, Slate River

valley, July 1, 1913."

A single young *Ophiogomphus* nymph of indeterminable species was found in the stomach of a common sucker, taken from Lake Nipigon off Black Water River, July 31st, 1922. Fragments of another nymph were taken from the stomach of a round whitefish (*Coregonus quadrilateralis*.)

15. *Gomphus brevis* Hagen. Exuvia of this *Gomphus* were plentiful on the banks of the Pustagone, together with those of *Ophiogomphus rupinsulensis*, July 14 to 24, 1920. Only 3 adults were obtained, 2 females on July 14 and a male on July 17. Mr. Bigelow, however, captured 4 males and 2 females at Wabinosh on July 28, 1923, and there are 2 females in the Carnegie Museum, collected by Mrs. Jennings on sand flats in the Slate River Valley.

Nymphs of this species were found in the stomach contents of three sturgeon from Lake Nipigon, collected by Mr. W. J. K. Harkness of the Fisheries Research party, two on July 24, the others on Aug. 5, 1922. The data from this material is as follows:—

No. 1, July 24—1 full-grown, 5 young nymphs.

No. 2, July 24—4 young nymphs.

No. 3, Aug. 5—4 young nymphs.

Each of these stomachs contained also nymphs of *G. scudderi*, *G. lividus* and *Macrómia illinoensis*.

16. *Gomphus lividus* Selys. Young nymphs of this species were found in the stomach contents of sturgeons Nos. 1 and 2 (see under *G. brevis*) No. 1 contained one specimen. No. 2 six. No adults of this species have been taken in this district.

17. *Gomphus exilis* Selys. We found this species at only one locality, a small lake, one of the series connected by channels with the upper end of Orient Bay. The west shore of the lake is steep and rocky, but with a fringe of standing aquatic plants, and it was here that the Gomphi were found. They were very abundant but only males were noticed and none were seen in the open marsh at the head of the lake. They were seen on only one occasion, July 18, 1920. Exuvia were common also.

18. *Gomphus spicatus* Hagen. We did not meet with this species, but Mr. Bigelow took a female at Black Sturgeon Lake, July 20, 1922, and there is a pair in the Carnegie Museum, taken on Silver Islet, Lake Superior, July 9, 1913, by Prof. and Mrs. Jennings.

19. *Gomphus scudderi* Selys. A nymph, just beginning to emerge, was taken by Mr. Bigelow at Gull Lake, Lake Nipigon, July 23, 1922. Young nymphs were also found in the stomach contents of sturgeons Nos. 1 and 2 (see under *G. brevis*), No. 1 containing three and No. 2 nine nymphs. The largest of these was 14.5 mm. long. Another young nymph was found in the stomach of a common sucker, 77 in. long, from Gull River, July 24, 1922.

Although no adults were seen, this species is probably common under suitable conditions.

20. *Hagenius brevistylus* Selys. A male and a female of this large gomphine were taken by Mr. Bigelow at South Bay, Lake Nipigon, Aug. 4, 1921. This is the most northerly locality from which it has been obtained. It is common in the Timagami Forest Reserve.

21. *Boyeria grafiana* Wmsm. An exuvium was found on the Pustagone River on July 14 and a newly transformed female with its exuvium on the 17th, 1920. A male was taken at Macdiarmid on Aug. 17, 1921, and a female on Sept. 4, 1923, by Mr. Bigelow, and 9 nymphs were dredged the same season by the Fisheries Research party from the Pustagone and Bear rivers. These consist of seven from the former stream, taken July 20, two of about the ante-penultimate stage, the others much younger; and one very young specimen from the latter stream, taken July 18, 1922.

This species is probably common in the Lake Nipigon region, but we left the locality when the season of its imaginal life had just begun.

22. *Basiaeschna janata* (Say). The season of adult life was practically over for this species when we arrived at Orient Bay in 1920, but we found a dead male floating on a small lake just south of Orient Bay on July 18. One nymph, penultimate stage, was taken by the Fisheries Research party at the northern end of Lake Nipigon (Ombabika Bay) July 4, 1922, and another of the same stage from Orient Bay on Aug. 11, 1922. A male and two female adults are in the collection of the Carnegie Museum, taken at Orient Bay by Mrs. Jennings between June 30 and July 22, 1914. They are decidedly large specimens and the species seems to increase in size northward throughout its range.

(To be Continued)

ANNUAL MEETING OF THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

The British Association for the Advancement of Science will hold its 92nd Annual Meeting in Toronto, Canada, from the 6th to the 13th of August.

A cordial invitation is extended to all Americans and Canadians who are interested in Science to become members for this meeting. No technical qualifications are required for membership.

More than 500 leading British and European Scientists have signified their intention to be present at the meeting, which is organized in thirteen sections as follows:—Mathematics and Physics (including Meteorology), Chemistry, Geology, Zoology, Geography, Economics, Engineering, Anthropology, Physiology, Psychology, Botany, Education and Agriculture.

Recent advances in science will be discussed at the sectional meetings. In addition, many popular lectures will be delivered to members by leading scientists. Four "citizen's" lectures and three children's lectures will be open to the public, and free.

The meeting affords an exceptional opportunity for intercourse between American, British, Canadian and European workers in science, and all who, while not engaged in scientific pursuits, are interested in the results of scientific endeavour.

The fee for membership is five dollars and the membership ticket admits the holder to the sectional meetings, popular lectures and to the receptions, local excursions, etc., which are features of the meeting.

Membership tickets may be obtained from the Local Secretary, Major J. M. Mood, Physics Building, University of Toronto, who will forward a preliminary programme on application and who will gladly supply any additional information desired.

